



PROCEEDINGS OF THE
**EDUCATION
RESEARCH**
Colloquium
2018

BETWEEN
FACULTY OF EDUCATION, UNIVERSITI TEKNOLOGI MALAYSIA (UTM)
& UNIVERSITAS NEGERI MAKASSAR, INDONESIA



UTM
UNIVERSITI TEKNOLOGI MALAYSIA



Cetakan Pertama/ First Printing 2018
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Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

Abdul Halim Abdullah, 1983–.
2018 PROCEEDINGS OF THE EDUCATION RESEARCH COLLOQUIUM
BETWEEN FACULTY OF EDUCATION, UNIVERSITI TEKNOLOGI MALAYSIA
(UTM) & UNIVERSITAS NEGERI MAKASSAR, INDONESIA / Abdul Halim Abdullah et
al.

ISBN 978-967-2171-12-6

Editor: **Abdul Halim Abdullah et al.**
Cover Design: **Fadhilah Othman**

Published in Malaysia by

Faculty of Education
UNIVERSITI TEKNOLOGI MALAYSIA
81310 UTM Johor bahru, JOHOR, MALAYSIA

<http://educ.utm.my/>

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Faculty of Education,
Universiti Teknologi Malaysia

Foreword by the
Dean of Faculty of Education, UTM

Assalamualaikum w.b.t and Good Day

Ladies and gentlemen,



It is my pleasure to welcome you to the Education Research Colloquium between Faculty of Education, Universiti Teknologi Malaysia (UTM) & Universitas Negeri Makassar (UNM), Indonesia. This colloquium is a platform for both institutions to sustain a harmonious and stable global society and to promote international cooperation and exchange. As we know, UTM participated in a wide variety of collaborative relationships with universities, institutions and individuals in many countries. I am confident that through this colloquium, relationship and friendship between FP UTM and UNM will become stronger. I would like to take this

opportunity to congratulate all presenters in this colloquium. I am sure that the variety and depth of the research presented at this colloquium will be appreciated by the audiences. In summary, I believe that this colloquium is just a start for a more fruitful and continuous collaboration between FP UTM and UNM.

Thank you

A stylized handwritten signature in black ink, consisting of a large, flowing 'S' shape followed by a horizontal line.

Professor Dr. Muhammad Sukri Saud
Dean
Faculty of Education
Universiti Teknologi Malaysia

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Use of Experimental Method of Effect on Student Learning Activity at Lesson of Natural Science

Erma Suryani Sahabuddin¹ & Andi Wahyuni²

^{1&2}*Faculty of Education, Universitas Negeri Makassar, Indonesia*

ermasuryani@unm.ac.id

Abstract:

The problem in this research is the lack of active learning of students on natural science subjects Inpres Toddopuli I Kecamatan Panakkukang Makassar City. The formulation of the problem in this research is (1) How is the description of the experimental method on the students' learning activity on the subject of natural science (2) What is the description of the students' learning activity after the experimental method used on the subject of natural science and (3) Is there any influence of the experimental method on students' learning activeness on the subject of natural science. The approach of this research is quantitative approach with experimental research type. The variables of this research are independent variable or experimental method contained in the experimental object which is given symbol (X) and dependent (dependent) or student learning activity on the subject of science which is given symbol (Y). The research design used is pretest-posttest control group design. The population in this study were all students of class IVA and class IVB which amounted to 81 people. The sample of this research is class IVA and class IVB which become experiment class and control class with stratified random sampling technique. Data collection techniques used are observation, questionnaires and documentation. Data analysis techniques with descriptive statistical analysis and inferential statistics. The result of the research shows that (1) description of difference seen from learning activeness by using student experiment method is very enthusiastic in following teaching and learning process while student learning activity using direct learning is lower (2) Student learning activity using experiment method is in good category and liveliness of student learning by using direct or conventional learning is in enough category (3) Experimental method have a significant effect on student learning activity on science subject.

Keywords: Experimental method, direct learning, Activity learning, elementary school students, dependent variable and independent variable

1.0 Introduction

The rapid development of technology in the current era of globalization has provided many benefits in the progress of various social aspects. The development of this technology must also be followed by the development of Human Resources. Human adaptation to new technologies that have been developed must be done through education. (Conley & Udry, 2010). This is done so that future generations are not left behind in the case of new technology. Education is an effective means of supporting the development and improvement of human resources towards a more positive direction. The progress of a nation depends on qualified human resources, where it is largely determined by education.

Education science natural knowledge emphasizes the provision of experience directly to develop the competence so that students are able to explore and understand the nature

around scientifically (Golinski, 2008). In learning science natural science is needed skills of an educator or teacher in delivering teaching materials so that students can easily understand the material presented. (Lawson, 1989). In addition natural science is also known as theoretical knowledge obtained by a special method.(Chisholm & Scheffler, 1966) .

The subjects of in Elementary School is one of the learning programs that aims to develop curiosity, positive attitude and awareness about the relationship of mutual influence between natural science, environment, technology and society and can solve problems and make related decisions with everyday life. The importance of education for students is a second component of education that is not less important in determining the success of the learning process that requires teachers to perform functions and roles well. The success of a student in learning can be seen from the liveliness and student learning achievement in question. One of the capabilities that must be owned by an educator or teacher is how to manage the learning process so that learning objectives can be achieved as much as possible. Therefore, a teacher is required to hold a renewal in the learning process, especially in Learning Natural Science Science. But the liveliness of learning that became the benchmark of success, is still far from being expected.

The learning process has a negative impact on the students, among them: (1) students are less concerned about teacher explanation; (2) students lacking in conducting the experimental process; (3) students feel saturated and less attention to the teacher when explaining; (4) students play around in the learning process; and (5) passive students in learning activities in the learning process, of course, a teacher does not want to give a bad impact on the students. Every teacher wants a fun and student-centered learning process.

One of the learning that can give opportunity to student to be actively involved in learning process that is through experiment method. According to last research that: "The experimental method is a way of teaching when students do an experiment on something, observing the process and writing the results of the experiment, then the results of observations are submitted to the class and evaluated by the teacher. The experimental method is very supportive of the creation of an optimal teaching and learning process where the attention of the students is more focused on the given lesson. During the learning process students can participate in active natural knowledge and gain hands-on experience, and can develop their skills, so that students can better understand the subject matter well taught, with experimental methods in learning can involve students actively in the process of the discovery of the material taught so that liveliness student learning can be better. (Kim, Brown, Fields, & Stichler, 2009).

The experimental method is as a way of teaching and learning involving students by experiencing, testing and proving their own experimental processes and results. Implementation of experimental methods helps students in their learning process. This method is also an opportunity for individual or group students, to be trained in a process or experiment and also students can be trained in a scientific way of thinking. With this method students are given the opportunity to experience themselves or conduct themselves, follow the process, observe an object, analyze, prove, and draw their own conclusions about a particular object, state or process. Thus, students are required to experience themselves, seek truth or try to find a law or proposition and draw conclusions from the process they experienced in learning.

The article shows about the description of experimental methods, learning activeness and effectiveness of learning model on the subjects of science nature science.

2.0 Research Methods

The approach used in this research is a quantitative approach by quasi experimental design. The variables in this study are the influence of the experimental method as the independent variable given the symbol (X), and the learning activity of the students in the subjects of Science Natural Science in the fourth grade of Indres of Toddopuli I Subdistrict Panakkukang Subdistrict of Makassar City as the dependent variable given the symbol (Y). The design of this research is pretest-posttest control group design. In this design there are two classes chosen at random then given a pretest to know the difference of initial state between the experimental class and the control class. A good pretest result is if the class values differ significantly. The research design used described memalaui table as follows:

The population in this study were all fourth grade students of SD Inpres Toddopuli I Kecamatan Panakkukang Makassar City in the academic year 2017 with the number of students as many as 81 people consisting of IVA class as many as 40 students, the number of female students 23 and 17 men, while the IVB class as much 41 students, the number of female students 22 and men 19. The technique used in sampling is stratified random sampling (random stratified sampling technique) consideration that this research is experimental research so that to facilitate doing treatment in the form of learning by applying method, hence set to do grouping to two classes, that is set class which become experiment class and class control group. To define the class that is the experimental group and the control group is done by drawing and determining the value of low student learning activity. Based on the agreement, the class IVA as the experimental group and the IVB class as the control group were determined.

Data collection techniques used in this study are observation, questionnaire and documentation. While analysis technique were descriptive analysis and inferential analysis.

3.0 Research Result and Discussion

The collecting data about the students' initial ability was done in both groups of researchers to conduct preliminary or pretest tests. Then after treatment was given to the experimental group and subsequent control was given posttest in both groups. This posttest is the final test to determine students' ability after being given treatment.

3.1 Descriptive Statistics Analysis Result

Pretest descriptive statistical analysis in the experimental and control classes. The result of descriptive statistic analysis is intended to obtain a description of the students' learning activeness level in the subjects of science natural sciences in the form of experimental method application in experimental group and conventional learning or direct instruction model in control class, the following is presented statistics of students' learning activeness scores on the subjects of science.

Based on the comparison of questionnaire value analysis, the students' learning activity of the experimental class before and after using the experimental method is assessed from the pretest statistic score or the initial questionnaire of the students on the subjects of science

natural science, in the fourth grade of Indres of Toddopuli I Subdistrict, Panakkukang Subdistrict, Makassar City, experiments in the experimental class showed that the sample size was 30 students, the mean (mean) was 79.23, the median value (middle value) was 80.40, the standard deviation value (statistical distribution) was 5,463, the variance value (kaudrad number) was 29,840, with score range 21, lowest or minimum score 67 and highest or maximum (highest score) 8 while the sum value (total probability value of initial test of experiment class) is 2377. This indicates that students' learning activity in The Natural Science Science class experiment before using meto de experiment is in good category (B).

While the result of data statistic processing for posttest that was taught by experiment method in experiment class showed that the sample size was 30 students, mean or mean value was 79.53, median value was 80.00, the standard deviation value was 3,928, the variance value was 15.432, with score range 21, the lowest or minimum score of 70 and the highest or maximum value 91 while the sum value or the amount of probability of the initial test of the experimental class of 2386. This indicates that the learning activities of the students on the subjects of the experimental class after experimental methods have improved and are located in either category (B).

Statistical analysis for experimental group using experimental method and control group with direct instruction grouped into five categories of students' learning activity level is very good category (SB), good (B), enough (C), less (K) and very less (K).

The frequency distribution shows the level of the students' learning scores on the subjects of science natural sciences, the experimental group students before being given treatment as much as 1 respondent are in enough category (C) with percentage (3%) and 24 respondents are in good category (B) with percentage (80%) and 5 respondents are in very good category (SB) with percentage (17%) with average score 79,23 which means it is in good category (B). While the frequency distribution of control group before being given treatment is 8 respondents are in enough category (C) with the percentage (26%) and 23 respondents are in good category (B) with percentage (74%) with the average value of 73,03 means to be in either category (C). The purpose of making the frequency distribution is to know the ratio of the percentage of student intervals from the highest value to the lowest value.

Posttest descriptive statistical analysis in the experimental and control classes. After the learning process using the experimental method, then held the final test or posttest as the final step in the implementation of this study. The description of the students' learning activity in the subjects of science nature know after the experimental method used in the experimental class and direct teaching on the control class can be seen in the table of descriptive statistical analysis as follows:

Statistical analysis for control classes with direct teaching or conventional learning shows that the sample size is 31 students, mean (mean) value is 73.03, median value (middle value) is 74.80, the standard deviation value (statistical distribution) is 5,958, the value variance (total kaudrad) of 35.499, with a range (range of values) score of 22, the lowest or minimum value (smallest value) 60 and the highest or maximum (82) and the sum sum This indicates that students' learning activeness in the subjects of natural sciences control class is in good category (B).

Posttest statistical analysis for control class with direct instruction or conventional learning shows that the sample size is 31 students, mean or average value is 75.16, median value is 54.50, standard deviation value is 4,252, variance value is 18,073, with score range 21 , the lowest or minimum score of 66 and the highest or maximum value of 87 while the sum value or the number of obstetric values of control class initial test amounted to 2330. This indicates that the learning activities of students on the subjects of control class or conventional learning also increased only still remain in the good category (B).

Distribution and percentage of posttest score questionnaire of students' learning activity on the subjects of science natural science, students are taught by experimental methods and direct teaching.

The frequency distribution shows the level of students' learning scores on the subjects of science natural sciences, the experimental group students after being given treatment as much as 1 respondent are in very good category (SB) with percentage (3%) and 29 respondents are in good category (B) with percentage (97%) with an average grade of 79.53 which means being in either category (B). While the frequency distribution of the control group after the learning process using the direct teaching without using the experimental method is as much as 1 respondent is in very good category (SB) with percentage (3%), 28 respondents are in good category (B) with percentage (90%) and 2 respondents are in enough category (C) with percentage (7%) with average value 75.16 which means it is in good category (C). For more data can be seen in appendix 19.

Based on the results of the data can be seen comparison of the average value of the experimental group after treatment or posttest value with an average value of 79.53 while the average value of the control group 75.16. By the difference of 4 from the difference in the mean score of the two groups, this proves that there is a significant difference between the experimental group treated using the experimental method and the control group that did not use the experimental or direct teaching method.

3.2 Inferential Statistic Analysis Results

The analysis is used to find out the effectiveness of learning method. Based on the value $t_{\text{arithmetic experimental class}} > t_{\text{table}}$ ($4.233 > 1.70$) and the value of $t_{\text{arithmetic control class}} > t_{\text{table}}$ ($4.168 > 1.69$), then H_a accepted. This means that students' learning activeness in the subjects of science natural sciences, students who are taught using experimental methods are more effective than the learning activity of students who are taught by using direct instruction because the value of significance level is different. For the full data can be seen in appendix 22 of Statistical Package for Social Science (SPSS) version 20.

3.3 Activity of Student Learning

The result of observation on student learning activity in the experimental class which held three meetings during the learning process took place by using the experimental method can be described as follows:

- a) Students work when assigned by teacher 91.11%.
- b) Students express their opinions when asked by teachers to express an opinion of 81.11%.
- c) Students express opinion in doing group task 67.88%.

- d) Students ask things that are not clear to the teacher 63.77%.
- e) Students do group work 92.33%.
- f) Students answer questions from other friends 50.55%.
- g) Students join the conclusion made friends 55.77%.
- h) Students raised hands to participate in concluding lessons 84.22%

The result of observation of student learning activity on experimental class of meeting I, II, and III shows that the percentage of student learning activity has increased significantly. Based on these data it can be concluded that the existence of an increase in student learning activity in the experimental class using experimental methods with a descriptive scale is in either category (B).

3.4 Learning through the use of direct instruction.

The result of observation on student learning activity during the learning process took place by direct teaching method during three times meeting can be described as follows:

- a) Students work when assigned by teachers 60.21%
- b) Students give an opinion when asked by teacher to convey opinion 45,16%
- c) Students express opinion in doing group work 44,08%
- d) Students ask things that are not clear to the teacher 19,35%
- e) Students doing group work 87.09%
- f) Students answer questions from other friends 24.73%
- g) Students join menanggapi conclusions made friends 30.10%
- h) Students raised hands to participate in concluding lessons 40.86%

The result of observation of student learning activity in control class of meetings I, II, and III shows that the percentage of student learning activity has increased. Based on the data on the results of student learning activities on the subjects of science natural can be concluded that the percentage of average student activity taught through direct teaching model is in the category of enough (C).

The result of the observation showed that the student activity on the learning by using the experimental method is more active than by using the direct teaching model. This is indicated by the percentage of each item for students taught using a higher experimental method than by using a direct instructional model. This means that learning by using experimental methods is more positively responded by the students than the direct teaching model. From the results of the analysis obtained, enough to support the theory that has been raised on literature review. When viewed from the involvement of students in the learning process, at the time of the experiment was the group using experimental methods showed a high interest, more spirit in learning and students can learn effectively. By applying the experimental method students can improve their skills in solving problems, especially for students who have low ability and make students happy to learn science nature knowledge. Based on the above description it is clear that learning by using experimental methods has an effect on students' learning activities in the subjects of natural science.

The role of the teacher in the experimental method is the facilitator and mediator who guides and directs the students from the stage to the next stage in conducting the experiment, so that it is done effectively. The advantages of experimental methods are the following: (1) with experimental students trained using scientific methods in the face of all problems, so it is

not easy to believe in something that is not certain truth; (2) they are more actively thinking and doing; which is highly desirable by modern teaching and learning activities, where students are more actively learning by themselves with teacher guidance; (3) students in carrying out the experimental process in addition to acquiring knowledge; also found practical experience and skills in using experimental tools; and (4) with student experiments proving themselves the truth of a theory, so that it would change their superstitious attitude, is an unreasonable event.

In addition to having several advantages, the experimental method also has some shortcomings. that: (1) tools and materials used in conducting experiments must be complete and generally expensive (2) hamper the speed of learning because the experimental method takes a long time; (3) errors in experimenting will lead to errors in concluding; and (4) not all teachers and students master experimental methods.(Kim et al., 2009)

4.0 Conclusion

Based on the discussion of research results can be concluded that:

- i. Description of students' learning activeness by using experimental learning methods where students look enthusiastic follow the learning process while the students' learning activeness by applying direct learning where the students look less antusias or lack of enthusiasm in the learning process.
- ii. Activity of student learning after being given treatment by using experimental method on the subject Of Science Knowledge The fourth grade SD Inpres Toddopuli I Kecamatan Panakkukang Kota Makassar for experimental class is in good category (B) while control class is in enough category (C).
- iii. Learning with experimental methods have a positive or significant effect on the activity of student learning on the subjects of science natural knowledge.

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